

FIGURE 10 — VOLTAGE MONITOR

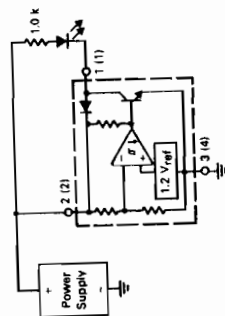


FIGURE 11 — SOLAR POWERED BATTERY CHARGER

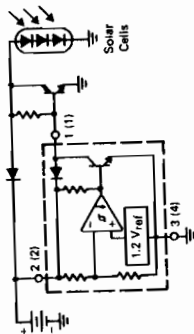


FIGURE 12 — LOW POWER SWITCHING REGULATOR

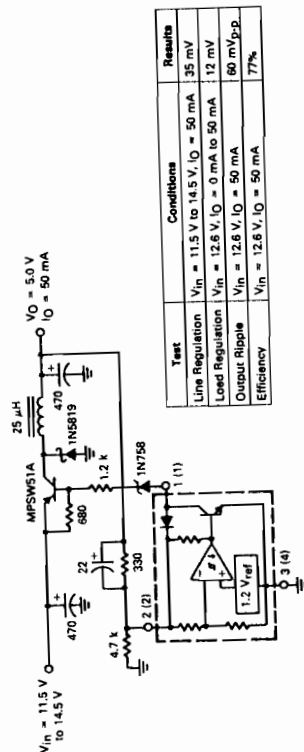
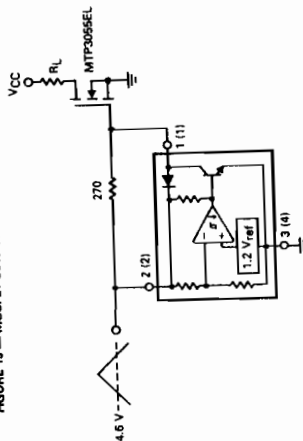


FIGURE 13 — MOSFET LOW-VOLTAGE GATE DRIVE PROTECTION



Overheating of the logic level power MOSFET due to insufficient gate voltage can be prevented with the above circuit. When the input signal is below the 4.6 volt threshold of the MC34064, its output grounds the gate of the L<sup>2</sup> MOSFET.



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## Advance Information

## HIGH PERFORMANCE DUAL CHANNEL CURRENT MODE CONTROLLER

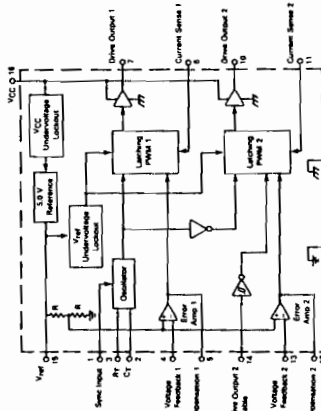
The MC34065 series are high performance, fixed frequency, dual current mode controllers. They are specifically designed for Off-Line and DC to DC converter applications offering the designer a cost effective solution with minimal external components. These integrated circuits feature a unique oscillator for precise duty cycle limit and frequency control, a temperature compensated reference, two high gain error amplifiers, two current sensing comparators, drive output 2 enable pin, and two high current totem pole outputs ideally suited for driving power MOSFETs.

Also included are protective features consisting of input and reference undervoltage lockouts each with hysteresis, cycle-by-cycle current limiting, and a latch for single pulse metering of each output.

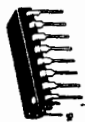
These devices are available in dual-in-line and surface mount packages.

- Unique Oscillator for Precise Duty Cycle Limit and Frequency Control
- Current Mode Operation to 500 kHz
- Automatic Feed Forward Compensation
- Separate Latching PWMs for Cycle-By-Cycle Current Limiting
- Internally Trimmed Reference with Undervoltage Lockout
- Drive Output 2 Enable Pin
- Two High Current Totem Pole Outputs
- Input Undervoltage Lockout with Hysteresis
- Low Start-Up and Operating Current
- Direct Interface with Motorola SENSEFET Products

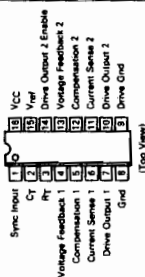
## SIMPLIFIED BLOCK DIAGRAM



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MC34065  
MC33065HIGH PERFORMANCE  
DUAL CHANNEL  
CURRENT MODE CONTROLLER  
SILICON MONOLITHIC  
INTEGRATED CIRCUITP SUFFIX  
PLASTIC PACKAGE  
CASE 848-08DW SUFFIX  
PLASTIC PACKAGE  
CASE 751G-01  
SO-16

## PIN CONNECTIONS



ORDERING INFORMATION		
Device	Temperature Range	Package
MC34065DW	0 to +70°C	SO-16
MC34065P	0 to +70°C	Plastic DIP
MC33065DW	-40 to +85°C	SO-16
MC33065P	-40 to +85°C	Plastic DIP

FIGURE 1 — RESET OUTPUT VOLTAGE versus INPUT VOLTAGE

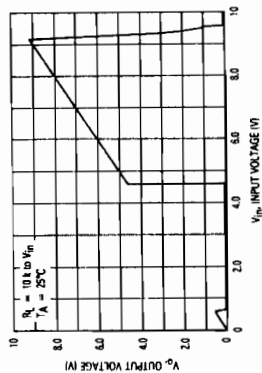


FIGURE 2 — RESET OUTPUT VOLTAGE versus INPUT VOLTAGE

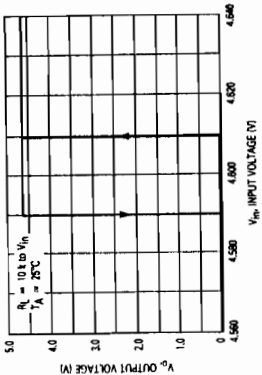


FIGURE 3 — COMPARATOR THRESHOLD VOLTAGE versus TEMPERATURE

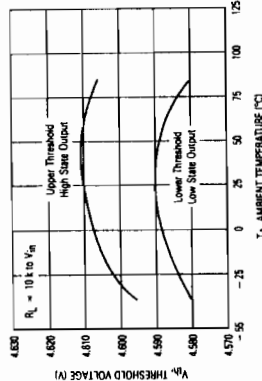


FIGURE 4 — INPUT CURRENT versus INPUT VOLTAGE

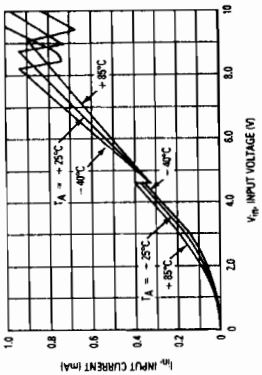


FIGURE 5 — RESET OUTPUT SATURATION versus SINK CURRENT

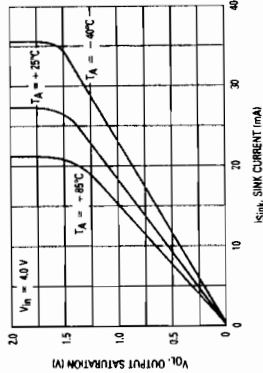


FIGURE 6 — RESET DELAY TIME

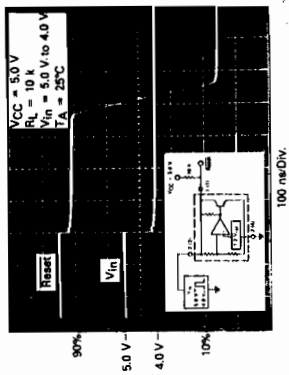


FIGURE 7 — CLAMP DIODE FORWARD CURRENT versus VOLTAGE

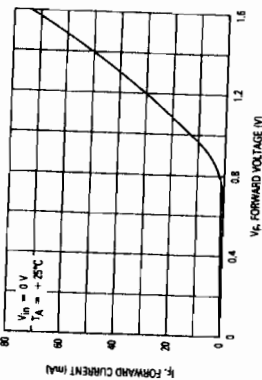


FIGURE 8 — LOW VOLTAGE MICROPROCESSOR RESET

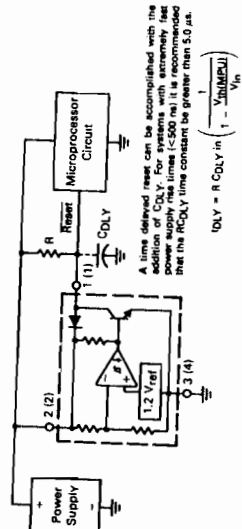
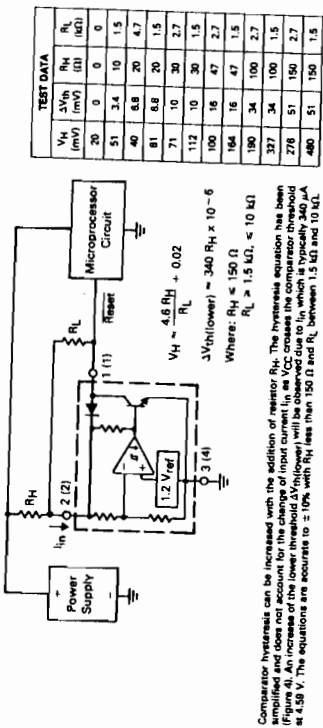


FIGURE 9 — LOW VOLTAGE MICROPROCESSOR RESET WITH ADDITIONAL HYSTERESIS



TEST DATA			
VH	ΔVth	RH	RL
(mV)	(mV)	(Ω)	(kΩ)
20	0	0	0
51	3.4	10	1.5
40	8.8	20	4.7
81	8.8	20	1.5
71	10	30	2.7
112	10	30	1.5
100	16	47	2.7
164	16	47	1.5
180	34	100	2.7
337	34	100	1.5
278	51	150	2.7
480	51	150	1.5



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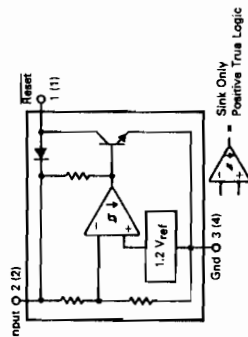
## Advance Information

### UNDervoltage SENSING CIRCUIT

The MC34064 is an undervoltage sensing circuit specifically designed for use as a reset controller in microprocessor-based systems. It offers the designer an economical solution for low voltage detection with a single external resistor. The MC34064 features a trimmed-in-package reference, and a comparator with precise thresholds and built-in hysteresis to prevent erratic reset operation. The open collector reset output is capable of sinking in excess of 10 mA, and operation is guaranteed down to 1.0 volt input with low standby current. These devices are packaged in 3-pin TO-226AA and 8-pin surface mount packages. Applications include direct monitoring of the 5.0 volt MPU logic power supply used in appliance, automotive, consumer and industrial equipment.

- Trimmed-in-Package Temperature Compensated Reference
- Comparator Threshold of 4.6 V at 25°C
- Precise Comparator Thresholds Guaranteed Over Temperature
- Comparator Hysteresis Prevents Erratic Reset
- Reset Output Capable of Sinking in Excess of 10 mA
- Internal Clamp Diode for Discharging Delay Capacitor
- Guaranteed Reset Operation with 1.0 Volt Input
- Low Standby Current
- Economical TO-226AA and SO-8 Surface Mount Packages

### REPRESENTATIVE BLOCK DIAGRAM



Pin numbers adjacent to terminals are for the 3-pin TO-226AA package.  
Pin numbers in parentheses are for the D suffix SO-8 package.

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MC34064  
MC33064

### UNDervoltage SENSING CIRCUIT SILICON MONOLITHIC INTEGRATED CIRCUIT

P SUFFIX  
PLASTIC PACKAGE  
CASE 29-04  
TO-226AA



Pin 1. RESET  
2. INPUT  
3. GROUND

D SUFFIX  
PLASTIC PACKAGE  
CASE 75-03  
SO-8



Pin 1. RESET  
2. INPUT  
3. N.C.  
4. GROUND  
5. N.C.  
6. N.C.  
7. N.C.  
8. N.C.

### ORDERING INFORMATION

Device	Temperature Range	Package
MC34064D-5	0°C to +70°C	Plastic SO-8
MC34064P-5	0°C to +70°C	Plastic TO-226AA
MC33064D-5	-40°C to +85°C	Plastic SO-8
MC33064P-5	-40°C to +85°C	Plastic TO-226AA

### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Input Supply Voltage	V <sub>in</sub>	-1.0 to 10	V
Reset Output Voltage	V <sub>O</sub>	10	V
Reset Output Sink Current (Note 1)	I <sub>sink</sub>	Internally Limited	mA
Clamp Diode Forward Current, Pin 1 to 2 (Note 1)	I <sub>F</sub>	100	mA
Power Dissipation and Thermal Characteristics			
P Suffix, Plastic Package	P <sub>D</sub>	625	mW
Maximum Power Dissipation @ T <sub>A</sub> = 25°C	R <sub>θJA</sub>	200	°C/W
D Suffix, Plastic Package	P <sub>D</sub>	625	mW
Maximum Power Dissipation @ T <sub>A</sub> = 25°C	R <sub>θJA</sub>	200	°C/W
Operating Junction Temperature	T <sub>J</sub>	+150	°C
Operating Ambient Temperature	T <sub>A</sub>	0 to +70	°C
MC34064		-40 to +85	°C
MC33064		-40 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

ELECTRICAL CHARACTERISTICS For typical values T<sub>A</sub> = 25°C, for min/max values T<sub>A</sub> is the operating ambient temperature range that applies (Notes 2 and 3).

Characteristic	Symbol	Min	Typ	Max	Unit
<b>COMPARATOR</b>					
Threshold Voltage	V <sub>TH</sub>	4.5	4.61	4.7	V
High State Output (V <sub>in</sub> increasing)	V <sub>OH</sub>	4.5	4.59	4.7	V
Low State Output (V <sub>in</sub> decreasing)	V <sub>OL</sub>	0.01	0.02	0.05	V
<b>RESET OUTPUT</b>					
Output Sink Saturation					V
(V <sub>in</sub> = 4.0 V, I <sub>sink</sub> = 8.0 mA)		—	0.46	1.0	V
(V <sub>in</sub> = 4.0 V, I <sub>sink</sub> = 2.0 mA)		—	0.15	0.4	V
(V <sub>in</sub> = 1.0 V, I <sub>sink</sub> = 0.1 mA)		—	—	0.1	V
Output Sink Current (V <sub>in</sub> Reset = 4.0 V)	I <sub>sink</sub>	10	27	60	mA
Output Off-State Leakage (V <sub>in</sub> Reset = 5.0 V)	I <sub>OH</sub>	—	0.02	0.5	μA
Clamp Diode Forward Voltage, Pin 1 to 2 (I <sub>F</sub> = 10 mA)	V <sub>F</sub>	0.6	0.9	1.2	V
<b>TOTAL DEVICE</b>					
Operating Input Voltage Range	V <sub>in</sub>	1.0 to 6.5	—	—	V
Quiescent Input Current (V <sub>in</sub> = 5.0 V)	I <sub>in</sub>	—	390	500	μA

### NOTES:

1. Maximum package power dissipation limits must be observed.
2. Low duty cycle pulse techniques are used during test to maintain junction temperature as close to ambient as possible.
3. T<sub>low</sub> = 0°C for MC34064  
T<sub>low</sub> = -40°C for MC33064  
T<sub>high</sub> = +70°C for MC34064  
T<sub>high</sub> = +85°C for MC33064

MC34064, MC33064